ANALYSIS

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TRUTH BY CONVENTION: A SYMPOSIUM BY A. J. AYER, C. H. WHITELEY, M. BLACK.

(To be presented at the week-end meeting of the Analysis Society, 9–10 January, 1937.)[1]

(1) A. J. Ayer

"THE source of the necessary truth of every law of logic," say Lewis and Langford on page 211 of their *Symbolic Logic*, "is in *definitions* arbitrarily assigned. The tautology of any law of logic is merely a special case of the general principle that what is true by definition cannot conceivably be false; it merely explicates, or follows from, a meaning which has been assigned, and requires nothing in particular about the universe or the facts of nature. . . . The only truth which logic requires or can state is that which is contained in our own conceptual meanings—what our language or our symbolism represents. Or to put it otherwise: there are no laws of logic, in the sense that there are laws of physics or biology; there are only certain analytic propositions, explicative of 'logical' meanings, and these serve as the 'principles' which thought or inference which involves these meanings must, in consistency, adhere to."

The view which is expressed in this passage is now very widely held. My purpose in this paper is not to defend or criticize it so much as to attempt to elucidate it. I shall find it a great deal easier to say what it does not imply than what it does.

[1]It was originally hoped that the three papers in this symposium would be consecutive. Owing to pressure of time, it has proved necessary for both the second and third paper to be written as replies to the first.

We may begin by considering the statement that the laws of logic, being true by definition, merely explicate a meaning which has been assigned. If this were interpreted literally it might be taken to mean that the meanings which were unravelled by the laws of logic were explicitly fixed on particular occasions, like the elements of the Code Napoléon : this might even be taken to be part at least of what the laws of logic were supposed to assert. I do not think that anyone would wish to hold the view that we are considering, if it was interpreted in this fashion. No one, I think, would wish to assert that logical constants originally acquired their meaning by means of explicit conventions. If anyone did maintain this he would lay himself open to the objection that those who first formulated the meaning of logical constants must already have attached some meaning to them. For they must have used them in making their formulations. The supposition that the meaning of the logical constants that occur in our language was originally assigned in terms of some other language in which they did not occur, besides being historically fantastic, does not meet the objection. For the same difficulty would arise in connection with the logical constants of that language.

There is a close analogy here with the Social Contract theory of politics. We find that if we attempt to found political obligation on a social contract we are confronted not only with the objection that there is no reason to suppose that such a contract ever was made, and indeed very good reason to suppose the contrary, but also with the objection that even as a historical fiction it must presuppose political obligation ; for otherwise it would not be binding. To this the answer is sometimes made that the contract referred to is not explicit but implicit ; so that to say that political obligation is founded on a social contract is to say no more than that it is founded on tacit consent. The point of introducing this analogy is that it suggests a way in which we may escape the difficulties which we have been considering. Instead of saying that the laws of logic explicate meanings which have been deliberately assigned, can we not say that they explicate meanings which are implicitly adopted in current usage and do not require to be explicitly formulated in order to be understood ? We shall still have to admit that the explicit assignment of meanings to logical constants can occur

only at a stage where meanings have already been implicitly assigned. But we can argue that, so far from there being anything logically vicious in the assumption that meanings can be adopted and adhered to before they are made explicit, it is what actually occurs.

This seems satisfactory, so far as it goes. But there still remains a difficulty. What do those who take this view suppose the laws of logic to assert? Do they assert that the meanings which they make explicit are, or have been, implicitly adopted in ordinary usage? If they do then they are empirical propositions about people's behaviour. But in that case they are not necessary; and those who say that the laws of logic are true by definition do not wish to deny that they are necessary. Rather would they claim for their view that it alone gave a satisfactory explanation of the necessity of a priori propositions. No one would maintain that a proposition which described how people actually used words, or even one which described how the person who asserted it was himself going to use words in future, could not conceivably be false.

This is intended merely to show that those who take a conventionalist view of a priori propositions do not mean to hold the theory that what are commonly said to be a priori propositions are really empirical propositions about the way words are used. It is not intended to be a refutation of this theory. Indeed, though I do not myself desire to maintain it at present, I am not at all clear as to the way in which it could be refuted. We might perhaps ask whether it was being maintained that it just happened to be the case that no necessary propositions ever were formulated and that the propositions which we took to be necessary and a priori were really contingent and empirical, which would leave open the possibility that some genuinely a priori, necessary propositions might some day be discovered, or whether the theory was that no necessary proposition ever could be formulated, because the notion of a necessary proposition was self-contradictory or meaningless. In that case it would be refuted by anyone who was able to give an intelligible account of necessary propositions. Furthermore it is to be remarked that the view that what are commonly thought to be a priori propositions are really empirical propositions of a peculiar kind is not the only alternative to the view that they are necessary. It

might be held that they are not, in the ordinary sense of the term, propositions at all.

I suggest that this is what is really being maintained by conventionalists. I think that our view must be that what are called a priori propositions do not describe how words are actually used but merely prescribe how words are to be used. They make no statement whose truth can be accepted or denied. They merely lay down a rule which can be followed or disobeyed. Their necessity then, we must say, consists in the fact that it does not make sense to deny them. If we reject them we are merely adopting another usage from that which they prescribe. It is in this sense only that they cannot conceivably be false. That this really is the view of at any rate the majority of those who account for the necessity of what are called a priori propositions by saying that they are conventions is borne out by the fact that they usually go on to say that these " propositions " say nothing and explain that the reason why no experience can confute them is that they make no assertion about any matter of fact.

If it is to be held that the laws of logic and other a priori " propositions " are purely prescriptive in character then it will be misleading to say that they are true by definition. That the word " definition " is misleading in this context has already been shown by Dr. Quine in his interesting article on Truth by Convention which appeared among the *Philosophical Essays for Alfred North Whitehead*. He argues there that a definition is ordinarily taken to be a " convention of notational abbreviation " and points out that in this sense " a statement inferred through a definition is true only because it is shorthand for another statement which is true independently of the definition so that " considered in isolation from all doctrine, including logic, a definition is incapable of grounding the most trivial statement." But even if we substitute the word " convention " for the word " definition " our expression will still be misleading. For if what are called a priori propositions are not statements at all but only rules then it is surely misleading to speak of them as being true.

Though we may not say that these rules describe how words are used, since that would be to turn them into statements about matters of fact, it being plainly a matter of fact that we use words as we do, we may say that they are for the most part in accordance

with our usage. Further, there is at any rate in the case of conventions about the use of empirical terms an obvious causal connection between the usages we adopt and the nature of our experiences. It is this, as Poincaré points out, that saves the formulation of conventions from being futile. Experience cannot confute them but it can show that their adoption is more or less useful and so cause them to be adhered to or abandoned. To this extent, they are not arbitrary. They are, however, arbitrary in some cases at least, insofar as it is conceivable that we should have chosen to adopt different conventions. It is not impossible to conceive of a world in which it would be futile to prescribe usages which we now adopt in the case of empirical terms, because experience would be such that it would not be profitable for anyone to obey such rules.

On the other hand, it seems to many people that the laws of logic are not arbitrary in this sense. The reason for this may be that when we say that a world is conceivable in which it would be futile to adopt the scientific conventions which we do adopt, we mean that the existence of such a world is compatible with the laws of logic ; and it seems strange to say that the existence of a world in which people spoke a language in which what we call the laws of logic were not adhered to is compatible with the laws of logic. For my part, I cannot at present see anything vicious in the supposition that there could be such a language ; that is, a language in which there were logical constants, but none that were allowed to function in the way that the logical constants of our language function. At least, it appears a harmless supposition until I ask myself what could be said in such a language ; and then it seems to me that I could not say of anything that it could be said in it. Perhaps this is what Wittgenstein meant when he said that we could not say of an unlogical world how it would look. The reason why we could not is, presumably, that no sentence which is not constructed according to the rules of symbolism which we prescribe and adopt can be intelligible to us. But is it not significant to ask Why do we adopt just these rules ? Is it a contingent fact ? If it is held to be a necessary fact in the sense that the laws of logic are, as is sometimes said, dictated to use by experience, it must surely be admitted that the grounds and the nature of this necessitation are excessively mysterious.

Another question about which I am puzzled is this. It would ordinarily be said that any set of conventions with which we operate must be self-consistent. What, in this context, is the significance of the word " must " ? Are we, when we say this, merely affirming the law of non-contradiction ? And is this to do more than issue a fiat concerning the usage of the negation sign ?

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(2) C. H. WHITELEY

I begin by excepting from consideration many of the sentences which are often put forward as being " laws of logic " ; namely, those sentences, such as " AB is A ", " *p* and not-*p* cannot both be true ", " *p* or *q* implies *q* or *p* ", which are invented by logicians for their own amusement and do not express any thought about the world. Nothing can be deduced from such genuine tautologies, and I cannot make out why people seem to find them so interesting. I am prepared to admit that these sentences state nothing about the world, except perhaps the equivalence of certain phrases in our language. So that as regards them I accept something like the conventionalist position.

But I think there is more in the conventionalist theory than the mere exposure of these impostors. It is essentially an attempt to deal with the problem of a priori knowledge, or, what comes to the same thing, knowledge of necessary facts, implications or entailments. The difficulties about this kind of knowledge are of two kinds. First, we seem by it to know facts about objects with which we have never been acquainted, which seems to most people a paradoxical state of affairs. Second, if implication or necessitation is a relation, it is extraordinarily difficult to say what are the terms of the relation. If they are entities in the world independent of our thought, they can hardly be said to be things or events, which do not logically necessitate one another ; and if they are facts, facts, and especially negative facts, seem to have a highly suspicious claim to be real entities. On the other hand, if they are sentences or propositions or thoughts or pieces of knowledge or belief, necessitation is a property of our thinking, and necessary propositions do not, as we want them to do, tell us something about the world. The conventionalist theory deals with this problem by denying that

there is any such thing as knowledge of necessities ; and so Mr. Ayer is entirely in the right in demanding that the opponents of the theory should give an intelligible account of necessary propositions, i.e. of the nature of necessitation. I do not claim to be able to do this, and where so many great philosophers have failed I see no reason to be ashamed of the fact ; but at the end of my paper I shall make a few remarks about necessitation which may possibly do something towards elucidating the problem, and at any rate will provide us with something to argue about if we get tired of discussing conventionalism.

At present I am only concerned to show that the conventionalists do not succeed in escaping this demand. For the theory does not seem to be statable except in terms of the idea of implication. For instance, Lewis and Langford say that the laws of logic " follow from " a meaning which has been assigned, and Ayer talks about the " implications " of a certain linguistic usage. I think conventionalists must at some point say that a certain usage is implied by or is inconsistent with the rules of the language ; and the inconsistency of a usage with a rule cannot be itself a convention. But I think the theory may be most satisfactorily criticized by trying to show that there are some propositions, other than the dubious tautologies which I mentioned above, which are necessarily true and which do not express linguistic conventions. For I think that the conventionalists would deny that this was the case.

When I say " I am in London ", I think everybody would agree that this sentence states a matter of fact concerning me and London, some relation between me and the city. Likewise when I say " I am not in Birmingham ", that sentence states a matter of fact about me and that city, not about the word " I " and the word " Birmingham ". My being in London and not in Birmingham would be the case irrespective of what the conventions of the English language were, or whether there was any language at all. Such sentences will be called " factual " sentences. The disagreement arises over such sentences as " I cannot be in London and in Birmingham at the same time " (hereinafter referred to as S), and the equivalent sentence " My being in London is incompatible with my being in Birmingham ", " If I am in London I cannot be in Birmingham ", etc. The orthodox theory is, I suppose, that S also states a matter of fact

about me and London and Birmingham, which differs from the other facts in being general, whereas they are particular, but is equally independent of linguistic usage. The theory under discussion, so far as I understand it, says that S would not be true unless we had adopted certain linguistic conventions, that the fact which it states, in virtue of which it is true, is a fact of convention. A sentence which states such a fact I will call a " linguistic " sentence. There are two sorts of sentences which are obviously linguistic in this sense. In the first place, there are definitions, such as " A quadruped is an animal with four legs " ; for these state the equivalence of different symbols. In the second place, there are grammatical rules such as " Apud takes the accusative " ; these are not definitions, nor do they follow from any definition, but they state the conventions adopted by all, or most, or all " correct " speakers of a given language. It is to be noted that in both these types of sentence words are used out of their normal meanings, to mean these words themselves ; " quadruped " here is equivalent to " the word quadruped ", and " apud " to " the word apud ". Now it seems clear that the sentence S is not a definition. It does not define " London " or " Birmingham ", and there is certainly no other word in the sentence which is to be defined in terms of London or Birmingham. Presumably, then, it states some linguistic rule.

I am not sufficiently well acquainted with the conventionalist theory to say with any confidence just how those who hold it would interpret S, and it may be that they would interpret it in a way which has not occurred to me ; if so I can only ask to be forgiven and enlightened. But it seems clear that the rules of language cannot command me to be anywhere, but only to say something, or not to say something. I suggest as a fairly plausible conventionalist interpretation of S " The rules of the English language forbid you to say " I am in London and also in Birmingham "." But the rules of the English language also forbid you to say " I seen him ". Are we to take it that " I am in London and also in Birmingham " is an impropriety of the same order as " I seen him " ? Obviously not ; we do not consider a man who makes such a remark as that unconventional, but insane ; and if it was a mere verbal prejudice which was asserted by S, S would be rendered false as soon as a sufficiently large

number of people could be persuaded to say " I am in London and also in Birmingham " a sufficient number of times. I submit that S cannot be true unless this other sentence, besides being unconventional, is also either meaningless or false ; if it can be true, then S is false. Is the sentence then meaningless ? Surely not. For it is simply " I am in London " plus " I am in Birmingham " ; and each of these sentences is intelligible, one being in this case true and the other false. Furthermore, the whole sentence can be intelligibly, and truly, denied. The sentence is therefore false ; and, moreover, it and all equivalent sentences must be false if S is to be true. If therefore S is rightly interpreted as stating something about all sentences of this type, it does not state that they are rare, but that they are false. But these sentences are obviously factual and not linguistic ; they make an assertion about my situation in space ; and my situation in space, and therewith the truth or falsity of such sentences, cannot be altered by linguistic convention. If therefore S states that all such sentences are false, S makes a general statement about matters of fact, and is a factual and not a linguistic sentence.

I have two other criticisms to pass upon the conventionalist theory, which do not depend upon any particular interpretation of S. The first is quite simple. If S makes a statement about linguistic usage, then the contradictory of S also makes a statement about linguistic usage. Now the contradictory of S is " I can be in London and Birmingham at the same time ". And this is even harder to interpret as a linguistic sentence than S itself. The second objection is this. Take the following train of thought. " I have an engagement in London for a certain evening, and an engagement in Birmingham for the same evening. In order to keep both engagements I should have to be in both places at once. But I cannot be in London and Birmingham at the same time. Therefore one engagement will have to be broken ". The last sentence here is plainly factual and not linguistic. But S, or rather the proposition expressed by S, seems to be essential to the inference. Without it the inference would be invalid. But if it is essential as a premise to the inference, it cannot be a linguistic statement, since you cannot deduce a fact about engagements from a fact about language. Is it seriously suggested that I must break an engagement be-

cause of the structure of the English language? But it may be suggested that my proposition occurs in the inference, not as a premise, but as the principle of the inference. If so, it still cannot be a linguistic proposition, for the inference is not about language; and if the proposition were linguistic, I think it would follow that I could not make the inference without saying the words to myself or writing them down.

These arguments will, I believe, apply to Mr Ayer's suggestion that the principles of logic, and presumably sentences like S, do not state anything at all, but are commands like "Use the accusative after apud" or "Shut the door". He takes this course in order to avoid admitting that they are not necessary; if they do not assert anything they are necessary in that they cannot intelligibly be contradicted. But surely the sense in which "Shut the door" is a necessary proposition is not the sense in which necessity is claimed for the principles of logic. And there are further difficulties. Not only are the chains of deduction upon which the symbolic logicians spend such a prodigious amount of labour not true, they are not even deductions; for you cannot deduce a command from another command. Symbolic logic then seems to be a particularly fatuous waste of time; a conclusion which does not distress me at all, since it confirms my suspicions and gives me a good excuse for my ignorance of the subject, but which I hardly expect to be popular with the readers of *Analysis*. I have one other remark to make about Ayer's paper, in respect of his doctrine that a world is conceivable which does not obey the laws of logic. Is this statement meant to be a tautology? I hardly think it is, for tautologies are necessarily true, and Ayer seems uncertain whether his statement is even true; moreover it would look very oddly as a convention or a command. But if it is a hypothesis, it is surely at least as difficult to verify as statements about God. I cannot help suspecting that in this doctrine the positivists are trying to eat their (or rather the metaphysician's) cake and have it, and that the statement is metaphysical after all. In any case, it violates what I take to be the real fundamental principle of empiricism, which is that you cannot conceive anything which is not of the same nature as something you have experienced.

I have come to the conclusion that attempts to represent sentences like S as statements of linguistic conventions, or as

stating nothing at all, are not satisfactory ; and I have committed myself to the view that the sentence states a matter of fact about the world, about me and London and Birmingham. I shall now make a suggestion about the kind of fact this can be ; for, as I have said, the best way to refute the conventionalist theory is to give an acceptable account of the sort of fact necessitation is. Let me begin by making a few remarks about Mary's hat. It is a beret, it is round, it is woolly, it cost a shilling, it came from Marks and Spencer's ; these are different facts about the hat. It is red, it is not green, it is brighter than Jane's hat, it clashes with Mary's complexion ; all these are also different facts about the hat, but there is clearly a particular sort of connection between them which there is not between the first set. We might call them all " chromatic " properties of Mary's hat ; and I believe I am describing a real fact when I say that there is a fairly obvious sense in which they are all determined by, or dependent upon, another property of the hat, namely its being the precise shade of colour that it is ; it is because it is that shade that it is not green and that it is brighter than Jane's hat. This sort of dependence has of course nothing to do with causation ; and it is only loosely that we can say that a change in the colour of the hat would cause a change in its other chromatic properties. Being coloured is one of the unique and fundamental ways in which a thing may be qualified. Each of the other fundamental types of qualities (determinates of different determinables, in W. E. Johnson's terminology) similarly determines relational properties of the same type. Thus my position in London is physically incompatible with all the positions in Birmingham (incompatibility is a relation holding between different determinates of the same determinable). Thus also the divisibility of a collection into three groups of four is determined by its fundamental numerical property of having twelve members. Now it is to be noted that the propositions describing this type of fact are a priori, that is to say that what can be asserted of a single observed instance is thereby recognised to belong to all instances ; I mean that anything having the same colour as Mary's hat would also possess its relational " chromatic " properties, anything else in London besides myself would be outside Birmingham, any other collection having twelve members would be divisible into three groups of four. I therefore suggest that at any rate one of the facts

which are referred to by the words necessitation, implication, etc., is a natural fact, not a fact about my thought, and that it is a fact about such a fundamental property of things as colour or position and the various chromatic or positional relations which depend upon it. If we adopt this position, then we are not claiming to know facts about objects with which we have not been acquainted ; for I have been acquainted with the colour of the hat or with my own position, and what is true of them as belonging to the hat or to me will also be true of them as belonging to anything else. But I do not put forward this suggestion with very much confidence. For, in the first place, I do not at present see what is to be said about syllogistic inferences if this account of necessitation is accepted. And in the second place, talking about the relations of qualities and relations seems to lead me nearer to the doctrine of independently subsisting universals than I want to go ; but I am not at all sure that the word " relation " is an unambiguous word.

University of Birmingham, November 1936.

(3) M. BLACK

Discussing the status of logical or mathematical laws involves an attempt to answer the following questions :

(*a*) Are such laws independent of experience ; if so, in what sense ?

(*b*) Are they ' true ' in a way which excludes the possibility of alternative logics and arithmetics ?

Those who answer the first of these questions by explaining that a priori laws are veiled conventions are thereby committed to a negative answer to the second. For a convention is a " general agreement or consent, deliberate or implicit . . . as embodied in any accepted usage". Since the essence of such an argument is that we give, or act, as if we had given, consent, *when we might in fact have chosen to do otherwise*, it follows that there is an element of arbitrariness in the convention itself. Some conventions of behaviour may certainly be more reasonable than others, i.e. more in conformity with logic, but the laws of logic themselves, regarded as conventions, obviously cannot be *deduced* from other, more fundamental, principles. Even the criterion of internal consistency is on this view an arbitrary

limitation on the form of an a priori law. For we need not choose to be self-consistent.

Thus to describe what "could not conceivably be false" as a convention is inconsistent with the meaning of the word. Consent to a law having absolute validity independently is a redundant gesture. It would be as reasonable to speak of consent or agreement to the law of gravitation. Thus conventionalism in respect of the interpretation of a priori laws implies relativity in respect of their validity.

This conclusion is not evaded by changing the expression of an a priori law, as Mr. Ayer proposes, from the indicative to the imperative mood. For those who propose this expedient invite us to translate a statement into a command and denial of the statement into disobedience to the corresponding command. If this theory is not to be an irrelevant diversion it must be presumed that the meaning of the original statement remains unchanged in the process of translation. To allow then, as Mr. Ayer does, that a rule of logic, considered as a command, "can be followed or disobeyed", means, in the original English, that there is nothing in the rule itself to show whether it, or a contrary rule, is true. Not only is it "conceivable" that the rule should be false, but only extraneous considerations can decide that it is, in fact, not false. In short, if the "necessity" of mathematical truths is reduced, as Mr. Ayer asserts, to the fact that, qua commands, "it does not make sense to deny them", then all mathematical propositions, whether true or false have an equal claim, in abstraction from social pressure, upon our obedience. For all such propositions, whether true or false, can be translated into commands. Of the rules of arithmetic as of the rules of the road the ultimate custodian is the policeman.

This deplorable equation of mathematical truth to social conformity arises from the abuse of the metaphor implicit in the word 'convention'. If those elements in the word implying a relativity of a priori truths to social environment are suppressed, however, the element of positive assertion in the conventionalist view shrinks to nothing. As a counterblast to those who base mathematical truth upon some mystical faculty of intuition, the conventionalist view has a polemical value; as a positive doctrine it is false.

To offset the embarrassing lack of objective differentiation

between the true and the false in logic and arithmetic it is claimed that " there is an obvious causal connection between the usages we adopt and the nature of our experiences ". Now knowledge of a causal connection implies knowledge that variation in the alleged cause is correlated with concomitant variation in the alleged effect. Thus the assertion implies access, through imagination, to experience of a sort incompatible with the laws of arithmetic. What kind of experience could this be ? Suppose every attempt to count a group of objects were to produce the disappearance of all the members of the group except one, so that the process of counting became a physical and psychological impossibility. Such a ' world ', though fantastically improbable, is perfectly " conceivable ". But no amount of vanishing or fusing of objects, whether in this or some other world, would have the slightest tendency to show, say, that $1 + 1 = 1$. Unfavourable psychological or physical conditions may retard or altogether prevent the discovery of arithmetic ; they can have no bearing on its validity. This is, in fact, admitted when it is said, as Mr. Ayer does, that experience " cannot confute " rules of arithmetic or logic. For if this is the case experience cannot support them either, since supporting one rule is equivalent to confuting another, its contradictory.

Whereas the plain conventionalist theory confuses mathematics with sociology, the attempt to justify the privileged position of " our " rules, by reference to a causal connection with experience confuses mathematics with physics. And the same confusion is implicit in any argument by analogy from the undoubted multiplicity of geometries. For, as in the case of arithmetic, it is important to distinguish between the geometry which is a branch of physics and that which is a branch of pure mathematics. This separation is not clearly made in Euclid's *Elements*. For appeals to spatial intuition (e.g. the famous implicit assumption concerning the intersections of circles[1]) involve observation either of experiments with physical bodies or of " *Gedankenexperimente* " which are their substitutes. Conceived in this light geometry is a very simple branch of

[1]Cf. Heath, *The Thirteen Books of Euclid's Elements*, I, 235 : " In the very first proposition the vertex of the required equilateral triangle is determined as one of the intersections of two circles, and we need therefore to be assured that the circles will intersect. Euclid seems to assume it as obvious, although it is not so ; and he makes a similar assumption in I.22."

physics and hence an empirical science whose validity is ultimately based on the conformity of experience to its basic postulates. And it is perhaps because the theoretical formulation of these parts of experience by Euclid extends beyond what can be verified in any finite region of space that doubts as to the validity of the parallel postulate arose.[2] But from the standpoint of pure mathematics, geometry makes no assertion at all about physical space and consists of a system obtained by logical deduction from uninterpreted axioms. From this point of view, geometry is a branch of universal algebra. And the discovery of non-euclidean geometrics is equivalent to the demonstration that the parallel postulate is logically independent of the remainder. But whether euclidean or non-euclidean geometrics find application to physical space is a question with which mathematics is not concerned.

It would be tempting to interpret arithmetic also by analogy as a system of deductions from uninterpreted axioms, and to speak of 'alternative' arithmetics obtained by modifying the axioms on which arithmetic is based. But this would be mistaken. If we were to observe a mathematician manipulating strange symbols or familiar symbols in strange combinations (e.g. $2+2=5$) we should first attempt to set up a one-to-one correlation between his symbols and equations and our own. If this were successful we should claim that his arithmetic was 'really' our own in a strange disguise; if not, that he was not engaged in arithmetic at all. For the validity of arithmetical results is unaffected by the trivial exchange of one system of symbols for another. And this is not simply an arbitrary definition of what we mean by arithmetic (identifying '*our* arithmetic' as arithmetic in general).

Since the whole of mathematics can probably be reduced to arithmetic, regarding the latter as an uninterpreted system would leave the whole of mathematics without any definite meaning at

[2] The postulate runs *That, if a straight line falling on two straight lines make the interior angles on the same side less than two right angles, the two straight lines, if produced indefinitely, meet on that side on which are the angles less than the two right angles.* The difficulty here is the presence of the word *indefinitely*. We could never be sure that lines of the sort described would not meet if produced sufficiently far—thus it would be impossible to disprove the postulate by observation. The same difficulty arises even in the most 'finitist' substitute for the postulate: *There exists a triangle in which the sum of the three angles is equal to two right angles* (Legendre). For we could never be sure from observation that the sum of the angles of a given triangle did not differ from two right angles by some small amount.

all. We should then be unable to distinguish mathematics, as in fact we can, from any other system exhibiting any regularity whatever.

Nevertheless, there is some excuse for confusing mathematical propositions with empirical ones. For to each mathematical proposition corresponds an empirical one about the signs of which the sentence expressing it is composed. Consider the propositions :

(A) $2+2=4$

(A′) *In modern English the sign* '$2+2$' *can be replaced in suitable contexts by the sign* '4' *without alteration of empirical meaning.*[3]

That A and A′ are different propositions is at once confirmed by substituting Greek numerals for Arabic in the sentences by which they are expressed. The first sentence continues to express the same proposition, while the second becomes the expression of another, false, proposition.

Now propositions of the type of A′ are empirical, referring to and verifiable by, the existence of a certain correlation between behaviour and environment. And they are connected, in a manner which needs further discussion, with the presence in a highly developed language like English of a redundance of synonymous phrases on the one hand, and of logical operators for the transformation of the meaning of material symbols on the other. Of such propositions it may be true to say that they " explicate or follow from a meaning which has been assigned ". And this may be (though I doubt it) all that conventionalists wish to assert.

But the mathematician claims to be independent of empirical propositions of the type of A′. If he is right in believing that his results are invariant in respect of transformations from one language into another, the question of ' alternative ' mathematics does not arise.

University of London Institute of Education, November 30, 1936.

[3] The phrase *without alteration of empirical meaning* needs further explanation. But since this would involve an elaborate discussion of the various kinds of symbols in a language, the vague formulative chosen may serve as a sufficient indication.

LANGUAGE AND REFERENCE

By M. MACDONALD

I SHOULD like to discuss some points raised by Mr. Bronstein's criticisms of Carnap in *Analysis* for April 1936. His view seems to be that if we admit Peirce's distinction between sinsign and legisign in the use of symbols we see that every symbol inherently involves reference to an object so that Carnap's attempt to describe language formally and without reference to meaning is necessarily invalid. 'Symbolising is a triadic relation between symbol, object and a system of reference which enables us to interpret a given symbol as referring to a certain object' (p. 56).

In the first place, I think Mr. Bronstein is mistaken in supposing that the type/token, sinsign/legisign distinction as such does involve reference to meaning. A legisign, according to Peirce, is, or is concerned with, a rule for the production of sinsigns. 'The word and its meaning are both general rules but the word alone of the two prescribes the qualities of the replicas in themselves'.[1] To say that the English word 'cat' is a legisign or type is simply to say that in order to write the word 'cat' you must make a sinsign of a particular quality viz. 'c a t', connected by a convention with the sound or spoken token 'cat'. In this sense 'cat' and 'chat' are different words although both have the same meaning, i.e. are used in the same way in both the English and French languages.

But in precisely the same sense 'brillig' is an instance of the type-word *brillig* although this word has no meaning, i.e. does not refer to any object. Yet we should certainly say that the *word* 'brillig' occurs in the work of Lewis Carroll. What we ordinarily mean by a word, therefore, is a sign composed of the letters of an alphabet used in the construction of a spoken language, e.g. English, French, Chinese, etc. and not a sign having an inherent reference to an object. If we came to use the word 'brillig' we should speak of giving the *word* 'brillig' a meaning, not of adding the *mark* or token 'brillig' to the English language by referring it to an object. Otherwise, the cross on Ali Baba's door would have become a word in the English language.

[1] C. S. Peirce. *Collected Papers*, Vol. 2, par. 293.

I do not see therefore why Carnap should not accept the type-token distinction without altering his doctrines of logical syntax. Nor can I see that this distinction has any bearing whatever on the status of metaphysical propositions as Mr. Bronstein seems to suppose (p. 51). For 'Reality' or 'Substance' in the metaphysical sense might be regarded as words like 'brillig' or 'runcible' and yet none of them have any meaning. I am not asserting that this is in fact the case but only that it is open to logical positivists to take this view so far as the use of the word 'word' is concerned.

But, Mr. Bronstein may still want to insist that even if all types are not used to refer to objects, at least some are, and it is these which are properly to be called words and symbols (as distinct, e.g. from 'nonsense-words') and which occur in 'systems of reference'. So that Mr. Bronstein's rule now becomes 'All words and symbols which can be significantly used must refer to objects'. Or, conversely, 'Nothing which does not refer to an object can be called a symbol'. But how is such a rule to be applied? Much of its plausibility comes from the fact that if almost any person were asked, what do you mean by saying that a symbol refers to an object, he would reply by pointing to a physical object, say a chair, as an object to which the word 'chair' refers or to a series of coloured patches as exemplifying the object to which the word 'red' applies. These in themselves are two very different processes, but if you went on to ask, and to what objects do mathematical symbols refer? he would find it less easy to reply. There is nothing which he can point out as the square root of 4 or an *n*-dimensional sphere though he may point to 2 physical objects and to something correctly called spherical according to the rules for applying arithmetic and geometry. This is again a quite different proceeding from the first two. Mr. Bronstein's analysis seems to overlook the fact that the word 'object' is itself part of our language and is used in accordance with certain rules which give it significance. We must know these before we can determine to what it is that a symbol refers. So that one term of the supposed symbolic relation presupposes that we know how to use a certain word or symbol though it was intended to explain the use of *all* symbols. The three-cornered relation looks neat and simple but it is perhaps doubtful whether any general rule based

on such a device can help us very far in understanding the use of symbols.

What suggest the idea of symbolism as a triadic relation are such cases as the first two given above where it is possible to give an ostensive definition of a term in use and such cases are admittedly numerous. But, as Carnap has pointed out,[2] an ostensive definition is still a *definition*, i.e. the translation of a word. It is still part of a language which we proceed to use in generally accepted ways or according to recognized rules. If the colour of this presented patch is ostensively defined as 'red' and I further know the rules for 'similarity' or 'sameness in colour' I shall so use the ostensive definition as to call pillar boxes, strawberries, doctors' gowns, etc., red and shall find that most English people do the same. Indeed, I do so partly as the result of having been taught by English parents. I have not, however, effected a peculiar relation between words and objects or facts in the world. At least that is a very misleading way of putting the matter. For, as we saw, what are to be called objects and facts in the world is itself part of what we *say*. For though in proceeding to use a language for ordinary or applied scientific purposes,[3] we take a certain number of ostensive definitions, we are not forced by facts in the world or anything else to take one rather than another or to use it in any particular way though *in fact* one choice is more likely to be convenient than another and we do generally agree in our definitions and their uses. If I sometimes call pillar boxes green instead of red I may be tested for colour blindness or a bad memory for colour names. If I sometimes call them red, sometimes green and sometimes blue I shall probably be regarded as too stupid to learn English properly as an ape is too stupid to do the tricks which a four-year old child does easily. Then people will give up trying to communicate with me as they will give up trying to play Bridge with me if I continually revoke. For the uttering of words without the observing of any rules or regularities of usage is not what we regard as being able to use a language. On the other hand, the correct use of a language, including the correct use of such a word as 'true', is what we call its corresponding with facts or things in the world. This does not, however, involve any such

[2] *The Unity of Science : Psyche Miniatures*, p. 39.
[3] As distinct from the use of symbols in pure mathematics.

metaphysical idea as that we ' create ' objects by the use of language for we have no such use for the word ' create ' and such a proposition would therefore be nonsensical. But it says simply that to say ' I correctly called this red but it is not red ' would be self-contradictory. This is even more clearly seen by considering the use of standards. When we established the standard yard and the standard pound we did not create yards of cloth or pounds of sugar but we gave a meaning to or a rule for using ' This is a yard of silk ' or ' This is a pound of sugar ', a rule whose correct usage is determined by comparison with a common standard. So that ' This exactly meets the two ends of the yard measure but is not a yard in length ' or ' This exactly balances the pound weight but does not weigh a pound ' are self-contradictory. And we established the standard in turn by selecting one physical object and using it as a means of judging the excellence of others in a certain respect. Such standards function as ostensive definitions in any language using signs which indicate the results of measurement.

So that when Mr. Bronstein asks whether a persistent metaphysician might not still ask whether numerals refer to things or to thoughts when, e.g. the statement ' Numbers are classes of classes ' has been transformed in the formal mode into ' Numerical expressions are class expressions of a certain order ' (p. 54) it is not perfectly clear what his difficulty is. We know what criteria we should ordinarily accept for saying that the word ' chair ' refers to an object or even that the word ' red ' applies to an object. They are criteria which involve sensible experience and the use of ostensive definitions. We also know the correct use of the word ' thought ' in English. But what are the criteria, in terms of linguistic rules and ostensive definitions, which are supposed to connect the word ' number ' with the words ' thing ' or ' thought ' and how do these compare with the ordinary English usage of these words ? In other words, how should we proceed to discover the things or thoughts which are odd and even, prime and composite, rational and irrational (in the mathematical sense) ? It is perfectly true, of course, as Mr. Bronstein points out, that there is a distinction between the use of the phrases ' the numeral 6 ' and ' the number 6 ' which corresponds to the type/token, distinction in the use of the word ' word '. We certainly call numbers and not marks odd and even, prime and

composite etc. We should say that the numeral '6' could be erased and replaced by the word 'six' though both stand for the same number. But the type-token distinction does not involve reference to objects and there seems no reason why the relevant differences in usage should not all be expressed in Carnap's linguistic rules for the translation of such phrases as 'the number 6' in terms of numerical expressions. But could any mathematician say that his thought was the number 6, was even and could be added, subtracted and multiplied, without talking nonsense? We just do not use the word 'thought' in this way in English. And if these differences of usage are held to show that the phrases 'the number 6' and 'the numeral 6' *must* refer to different objects what exactly is being said when the sensible criteria for the ordinary usages of 'object' are no longer present? Obviously no sensible criteria or ostensive definitions are possible without leaving pure mathematics. So that unless the persistent metaphysician can tell us how else he is using the word 'object' he is saying no more than that the usages of the two phrases in question are different which has already been admitted and is not in the least clarified by an esoteric use of 'object'. On the other hand, to deny that there is any point in saying that mathematical symbols refer to peculiar objects is not to deny in any sense the 'objectivity' of mathematics, that its propositions are true at all times for all competent persons, or to deny any of the distinctions ordinarily made by practising mathematicians. It is merely to question whether there is any metaphysical problem about the nature of mathematics as a system of rules concerning the uses of certain signs. Nothing of importance to mathematics is questioned.

Finally, Mr. Bronstein holds, that the reference to objects in symbols is shown by the fact that we do sometimes judge one symbolic system to be more appropriate than another (p. 56). He does not develop this contention, which appears at the end of his paper, though it is very commonly made against logical positivists. It is said that our choice between the 'more appropriate' system and all others is determined for us by the facts. It is to these that the system is 'more appropriate' and not to our own convenience in the use of language. It cannot therefore be the result of a mere arbitrary, linguistic convention as Carnap and others are understood to assert. Not that Carnap,

or anyone else, has ever asserted that any language comes into use as the result of anyone's personal volition apart from the general historical and psychological situation. But it might be useful to examine some more ordinary uses of the word 'appropriate' to see how they can be related to its use in connection with language.

We say, e.g., that slow music in a minor key, exemplified by some of the works of Chopin, Handel and Bach, is more appropriate for a funeral or for mourning than a negro fox trot or a comic opera. Or we say that a dress suit is more appropriate for a levee than tweeds and brogues. Is there then a unique non-conventional relation of correspondence between slow music in a minor key and the feeling of sorrow and the ceremony of burial or between wearing certain clothes and attending a certain kind of social function? If this means that it would be logically or even physically impossible to do otherwise in the same circumstances this is obviously false in the second instance. For we can easily imagine a social revolution in which dress clothes would be considered extremely inappropriate for any social function and as relics of a past snobbery. But the first case might seem to be more difficult. Can we imagine people who would play jazz at a funeral instead of Handel or Chopin? We should say that if they did they were not really mourning for the dead but rejoicing in their translation to a higher state, or some such thing. It might be said that slow music in a minor key is the appropriate expression of sadness because e.g. it is like weeping or moaning which again are the 'natural' expressions of feeling appropriate to the situation. Here again we might ask, in what sense 'like'? Certainly not in the sense that we should *call* such music weeping, as we should call two patches alike in colour, blue. On the other hand, there may be psychophysical connections such that the hearing of music relieved the same kind of tension as weeping does so that the criterion of its being 'like' weeping would be that it performed the same function. Then many other means might be equally efficacious and equally appropriate, e.g. drinking alcohol, but in fact the means usually taken are supplied by Chopin and Handel. We should not, therefore, need to invent special theories about their beliefs to explain the behaviour of people who relieved their feelings by the completely opposite method of playing jazz.

The particular method chosen would be as much a matter of convention or habit as the wearing of black clothes on the same occasion. We can imagine other behaviour which would be considered equally appropriate just as we can imagine a community whose members moved their heads up and down to signify 'No' and from side to side to signify 'Yes'. We should be seriously misled by this action because we follow the opposite convention which as it happens is almost universal but is not, so far as I can see, inherently connected with the facts of affirmation and denial. Is there indeed any sense in asking whether we are more justified by the facts in nodding to signify agreement as we do, and not in some other way? We may give a psychological or historical cause for such behaviour as we may for wearing the appropriate clothes and playing the appropriate music at a funeral but we have no reason for believing that it expresses any facts more perfectly than precisely the opposite behaviour.

But there is no important difference between nodding and *saying* 'yes'. Both are ways of expressing agreement and the same sense of 'appropriate' would seem to apply to both. Then the fact that we regard one form of language as 'more appropriate' than another is also an historical accident due to many factors of training and education as well as of experience. Practically everybody will give two strawberries the same colour name and strawberries and their leaves different colour names. Where this does not happen we usually account for it by colour blindness and make the necessary adjustments in communication. But we might equally well have *defined* 'same in colour' in such a way that strawberries and their leaves would always be given the same colour name. There is no *reason* why we should not, they are not perceived with labels bearing their colour names upon them but *in fact* we do not and we should regard anyone who did as either colour blind or stupid. It may be objected that we can imagine this only if we also imagine that everyone became colour blind and unable to recognise the obvious perceptible difference between red and green. But we also recognise a perceptible difference between the colour of pillar boxes and that of strawberries and yet we call them both *red*, even though different *shades* of red. Is there any reason why one difference should be ignored in our application of the word

'red' and not another? One reason, it may be urged, is that we can order shades of red in such a way that although there is no perceptible difference between A and B, B and C there is such a difference between A and C and that in no such order would a shade of green be found. Further, that the whole range of colours may be ordered so as to pass by almost imperceptible gradations into each other and that this can be observed in the spectrum. But does not this argument overlook the fact that the colour series is ordered by means of our accepted definitions of similarity and difference and with the help of such words as 'darker' and 'lighter' in colour? We do not learn the use of colour names by decomposing light and observing the spectrum, which is a sophisticated scientific operation, but we call what we observe in such circumstances the colour series, from the ordinary and established use of colour words. And we do so use these words that a difference between scarlet and crimson is placed within the same colour while one between crimson and emerald is classed within different colours, while for all that the facts demand both differences might have been classed together and strawberries and their leaves have received the same generic colour name. We are not obliged by the nature of colour to do one of these things rather than the other but we are constrained by our rules once these have been established. Otherwise, we shall just not be understood by normal people when we talk about colours. No doubt we are never likely to use the same colour name for strawberries and their leaves though we can imagine a new flower half of whose petals were red and half green receiving a colour name to cover both. Similarly, we are unlikely to make it a rule for scoring a goal that the ball should burst on entering the net since that in fact very seldom happens. But the hypothesis that there should be such a rule is perfectly intelligible though a game played in accordance with it would be very dull. And the hypothesis about red and green is equally intelligible and equally unlikely to happen.

So the use of 'appropriate' in connection with language does not require us to regard symbolising as a triadic relation between a sign, an object and a system of reference such that there is one and only one form of expression which fits the facts perfectly. It seems rather that there are many linguistic possibilities of which we do make use of one though we might use others and

may do so in the future. Symbols are used in accordance with linguistic rules, including those connected with ostensive definition, and without such rules we cannot give sense to the statement " A symbol must involve reference to an object."

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THE EXPLETIVE THEORY OF MORALS

By H. B. ACTON

MR. AYER, in his account of what might be called the expletive theory of morals (*Language, Truth and Logic* ch. vi), argues that statements containing normative ethical, terms, such as " murder is wrong ", are not really propositions at all, and so cannot be true or false. He also holds that casuistry is possible, and that casuistry is " a purely analytical investigation of a given moral system ". Hence he admits that casuists deduce propositions from propositions. Either, then, Ayer is inconsistent, or else no normative statements such as " murder is wrong " can form part of casuistry as understood by him. For in order to make deductions you must have propositions from which the deductions are made.

Everyone who tries to behave himself occasionally undertakes some sort of casuistry. The following is the sort of deduction drawn by those casuists who attempt to achieve logical rigour and consistency. Whether any casuist has made this deduction, or would make it, is, of course, irrelevant. But it looks as though it could be a valid deduction. (*a*) " Deliberate taking of human life, except in lawful war, or in self-defence, or in the carrying out of legal punishment, is wrong." (*b*) " Therefore it is wrong for a doctor to kill an unborn child in order to preserve the mother's life." (For such a doctor is not acting in self-defence, or lawful war, or as executioner.) According to the expletive theory of morals neither (*a*) nor (*b*) is a proposition. Hence (*b*) cannot be deduced from (*a*) no matter what genuine propositions we interpose to make this seem possible. Now it seems to me quite possible that, since (*a*) and (*b*) do look like propositions, and since, further, we *can*, by making suitable assumptions, deduce the one from the other, Ayer's theory of what constitutes meaningfulness is defective. That is, it seems more likely that (*a*) and (*b*) *are* propositions, than that Ayer's theory of meaning (which requires them not to be propositions) is true. A theory of meaning must account for the meaning of sentences that are generally admitted to have meaning, and it becomes suspect

if it entails that whole classes of sentences which are accepted by ordinary people as meaningful are really nonsensical. It is quite a different thing for sentences such as " unreal objects subsist ", which ordinary people do not consider at all, to be convicted of being nonsense.

However, believers in the expletive theory of morals could, perhaps, escape from this objection in the following way. They could say that (*a*) and (*b*), while they are not genuine propositions, look like genuine propositions because they are an elliptical way of expressing a set comprising both genuine and pseudo-propositions. What looks like the deduction of (*b*) from (*a*) would be the following set of propositions and pseudo-propositions. (i) " Deliberate taking of human life, except in lawful war, or self-defence, or the carrying out of legal punishment, is murder ". (ii) " Murder is wrong ". (iii) " A doctor who kills an unborn child is not acting in self-defence, nor as a soldier, nor as a legally appointed executioner ". (iv) " Therefore he is a murderer ". (v) " Therefore it is wrong to kill an unborn child to preserve the mother's life ". Here, (i), (iii) and (iv) are genuine propositions, and (ii) and (v) are expletives. (iv) can be deduced from (i) and (iii), while (ii) and (v) do not form part of an argument at all. They are in the nature of howls of rage which accompany the deduction. Thus, if this translation is correct it shows that the parts of casuistry which involve reference to moral worth are not propositions but expletives, and that the parts which are developed logically do not contain any reference to right and wrong. Paradoxical as this may seem, it follows from the expletive theory of morals.

This argument in favour of the expletive theory of morals lays bare an important assumption of the theory. Adherents of the theory assume that terms such as " murder ", " theft ", " cruelty ", or " benevolence ", " honesty ", " patience ", can be defined without any reference to right or wrong in a normative sense. If " murder " is a normative ethical term, then there could not be genuine propositions in which it functioned. According to the expletive theory, " murder is wrong " expresses our feeling of disgust at murder. But " that is an act of murder " is a proposition, and so contains no normative ethical reference. Is this assumption justified? Is it true that such notions as murder, benevolence, etc. can be defined without the introduc-

tion of normative ethical terms? Murder is not any sort of homicide, but unjustifiable (i.e. wrong) homicide. Theft is not just taking what belongs to someone else, but the unjustifiable taking of what belongs to someone else. Lying, perhaps, we do take to include all cases of deliberately saying that which is not, whether justifiable or not. But again, to assist the fortunes of an abandoned ruffian would not be regarded as benevolence. That is, benevolence is the helping of people in certain justifiable ways. In order, then, to maintain the possibility of casuistry (and, as I have already said, almost everyone attempts elementary casuistry at some time or another), we have to hold, either that murder, theft, benevolence, etc. can be defined without reference to right and wrong, or good and bad, or else that sentences containing normative ethical words are not expletives.

It will be objected, perhaps, that I mistakenly think that "murder" is a normative ethical word because I have been taught to feel horror whenever the word is used. Murder, it might be said, is the killing of people except the killing of them under certain circumstances. This is the sort of definition I gave in the imaginary instance of casuistry given above. I do not think that this reply refutes my argument, although it shows how I could have fallen into the mistake if my arguments are false. But it suggests a possible naturalistic theory of ethics which is not an expl tive theory, and which would give meaning to sentences containing the words "right" and "wrong".

It might be held that "right", as applied to an action, means "being an instance of charity, or benevolence, or honesty, or . . . etc." (assuming, as exponents of the expletive theory assume, that "charity" etc. can be defined without recourse to the notions of right or wrong, good or bad). Similarly, "wrong" would mean "being an instance of cruelty, or theft, or . . . etc." It would follow from this definition that "murder is wrong" or "honesty is right" are not expletives but analytic propositions. This might account for the strongly held belief of many moralists that they *know* certain normative ethical propositions to be true. For, if this theory were correct they would know that "murder is wrong" just as they know that "fathers are males". Whether the theory could be worked out in detail I do not know. But it might commend itself to those who now accept the expletive theory of morals, for it shares with that theory the assumption

that murder, honesty, etc. can be defined without recourse to normative ethical notions, and has the added advantage that it is in accordance with the almost universal belief that sentences containing the words "right" and "wrong" in a normative sense do express propositions.

Bedford College, London, October 1936

THE FORMAL MODE OF SPEECH

By C. D. HARDIE

IN a recent paper (*Analysis*, 3, 4) Mr. Bronstein discusses Carnap's doctrines of logical syntax, and attempts to show that there is a confusion in them because of an ambiguity in the word "word". Mr. Bronstein says:

"There are at least two distinct ways in which the word "word" can be used. (1) It may mean the physical shape in a given place, or the physical sound which occurs at a definite time. This is what Peirce calls a *sinsign*. . . . (2) It may mean not a single object but a type, which has instances, or a meaning which is exhibited by vehicles. This is called by Peirce a *legisign*, and the instances or vehicles are called its *replicas*. These *replicas* are *sinsigns*."

Mr. Bronstein is not quite sure whether Carnap's "formal mode of speech" is concerned with sinsigns or with legisigns. He thinks, however, that its definition makes it concerned with sinsigns, and maintains that the examples given by Carnap require it to be concerned with legisigns. He further maintains that if it is concerned with legisigns then real-object-sentences can also be translated into the formal mode of speech, and hence the distinction which Carnap draws, namely that between real-object-sentences, pseudo-object-sentences and syntactical sentences, breaks down. Thus his argument against Carnap may be put in the form of a dilemma. The formal mode of speech is concerned either with sinsigns or with legisigns. If the first, then the examples given by Carnap to demonstrate his anti-metaphysical position do not do so, since they use legisigns and not sinsigns. If the second, then any sentence at all can be translated into the formal mode of speech and so again his position breaks down.

It seems to me, however, that the introduction of the words "sinsign" and "legisign" introduces something which the logical positivist has no need to accept. They are not necessarily misleading but they may very easily be so, and I suggest that Mr. Bronstein has been misled by them. The danger is in regard to "legisign". It is a mistake to regard this as something whose instances are sinsigns, and if we do, pseudo-problems will at once arise similar to the pseudo-problems connected with, for example, number. What we have in fact are sinsigns, particular marks on paper particular noises, particular motions of the hands

(in the deaf and dumb language), and so forth. Some of these have a physical resemblance to each other. For example, in "the desk in this room is nearer to the fire than is the table" there are three marks all geometrically similar to the mark "the". We have in addition certain conventions regarding these marks, noises, motions, etc. By conventions I mean that people happen to agree that certain similar noises and certain similar motions may be represented on paper, blackboard, etc., by certain similar marks, and vice versa. There is also agreement as to what characteristics of marks are to be abstracted so as to enable us to decide if two marks are, or are not, similar. Marks which are similar we can call, if we like, instances of the same legisign, but we must remember that this means no more than that we can recognize similar marks. Similarly we can say, if we like, that a certain noise and the mark "the" are instances of the same legisign, but we must remember that this means no more than that there is a convention that noises similar to the one just produced should be represented on paper by marks similar to the one just written.

In addition to the conventions we have rules (formation and transformation rules) which govern the use of these similar marks, noises, etc.; that is, a rule about 'rose' will say something about the occurrence of any mark similar to that one. By these rules we can define material equivalence between sentences (as in Carnap), and we may then be able to give a rule concerning the substitution of one mark for a non-similar mark (e.g. 'valour' and 'courage'). When this is possible, we can say, if we like, that the corresponding legisigns have the same meaning or are synonyms.

With this explanation, I think the logical positivist can answer Mr. Bronstein's criticisms. The formal mode of speech is concerned with sinsigns. It may be convenient sometimes to abbreviate a translation from the material mode of speech and to use the language of legisigns, but the resulting sentences can always be translated again into sentences in which the word "word" is used only in the sense of sinsign. Let us consider if the examples given by Carnap are inconsistent with this.

(1) "The first chapter treats of metaphysics" is translated into "The first chapter contains the word 'metaphysics' or some synonym". This itself, I think, can be translated into something like: "The first chapter contains a sinsign similar to the sinsign 'metaphysics', or a sinsign similar to one which

occurs in a rule permitting the replacement of any sinsign similar to that one by any sinsign similar to the sinsign ' metaphysics '.

(2) " The rose is a thing " is translated into " The word ' rose ' is a thing-word ". This, I think, can be given the following meaning : " Among the rules governing the use of sets of similar sinsigns we can find a sub-class which we may call thing-rules, and the rules governing the use of sinsigns similar to the sinsign ' rose ' belong to the sub-class of thing-rules ".

It remains to point out what seems to me a fallacy in Mr. Bronstein's argument that real-object-sentences can be translated into sentences in the formal mode of speech. Since I claim to have shown that if the formal mode of speech is about legisigns it is also about sinsigns in the sense explained, this argument of Mr. Bronstein's would, if it were valid, still be an objection to Carnap's views. Mr. Bronstein says that " the rose is red " can be translated as follows : " the word ' rose ' is a thing-word and the word ' red ' is a colour word and the latter is predicable of the former." But this is ambiguous. If " the latter is predicable of the former " means the latter can be predicated of the former in the sense that it is not a contravention of any of the rules governing the use of sinsigns similar to ' rose ' and ' red ' to do so, then the sentence given is not a translation of " the rose is red " If " the latter is predicable of the former " means " it is a fact that the latter is predicated of the former " then the translation is not in the formal mode. Thus Mr. Bronstein is wrong when he says real-object-sentences can be translated into the formal mode of speech, or at least, this argument does not prove that they can be.

Cambridge

THE submission of any matter dealing as briefly as possible with single philosophical points is welcomed. The author of any published paper reaching a length of not less than two pages will receive free of charge a copy of the issue in which it appears, and may buy at half price further copies up to six. The editor will be grateful if contributors will, if possible, send typescript rather than manuscript, and will enclose stamped envelopes with the matter they submit. Proofs are ordinarily read by the editor. Each volume of *Analysis* begins with the first number of the first term in the university year, and consists of six numbers.